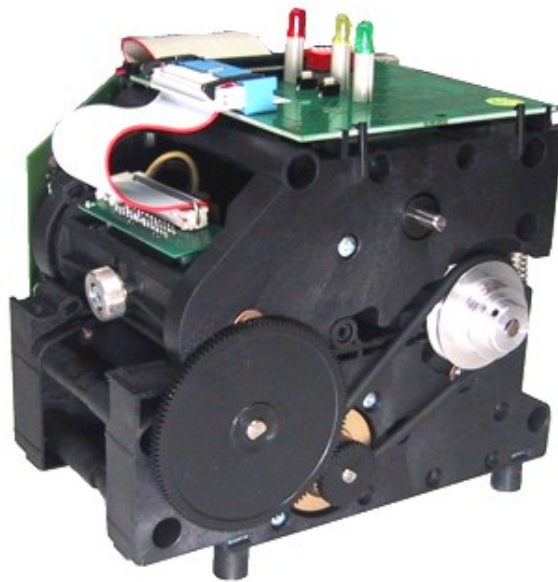




# **CX-one**

## CLEARjet OEM Module



OEM Manual  
Supplement to CX-one User Manual

Technical Data  
V1.1

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**CX-one OEM-User Manual**

**First Edition:** December 2004  
**Editor:** Henriette Zirl

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- Connect equipment to a grounded facility power source. Do not defeat or bypass the ground lead.
- Place the equipment on a stable surface (table) and ensure floors in the work area are dry and non-slip. Insulated rubber floor mats are preferred.
- Know the location of equipment branch circuit interrupters or circuit breakers and how to turn them on and off in case of emergency.
- Know the location of fire extinguishers and how to use them. ABC type extinguishers may be used on electrical fires.
- Know local procedures for first aid and emergency assistance at the customer facility.
- Use adequate lighting at the equipment location.
- Maintain the recommended temperature and humidity ranges at the equipment location.
- Use proper lifting techniques when moving or installing the equipment.
- Use standard electrostatic discharge (ESD) precautions when working on or near electrical circuits.
- Do not defeat or disconnect safety interlocks on covers. Operate the printer with the cover closed.

**Conformity Regulations**

This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with this instruction manual, it may interfere with radio communications. We confirm that the CX-one complies with the requirements of the EM Directive 89/336/EEC. This equipment has been tested and found to be within the limits for Class A, pursuant to norm EN55022. This product is equipped with reasonable protection against radio interference. Operation of this equipment may possibly cause interference. In the event of interference, the user, at their own expense, will be required to take whatever measures are necessary to correct the problem.

**Notice to Users of Printers Equipped with a Contactless Smart Card Coupler**

The contactless smart card coupler emits radio-frequency waves and must be used as installed and recommended by CLEARjet. You may not modify the coupler or how it is used without the written permission of CLEARjet. You may not operate the printer after modifying the coupler or its method of operation.

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# TECHNICAL INFORMATION CX-one – OEM

**Note:**

All information given in the CX-one User Manual is equally applicable to the CX-one - OEM Module (performance, print areas, expected lifespan, maintenance periods, etc.).

This manual details technical data that differs from the standard device and is relevant to the OEM Module only, as well as further information on implementing the module.

## 1. ENVIRONMENT

The CX-one OEM Module is designed for implementation in other devices (e.g. vending machines, ticket dispensers).

When installing the Module in other devices you should make sure that the appropriate conditions (e.g. airflow, cooling, heating, etc.) create the correct operating conditions for the device, as detailed below.

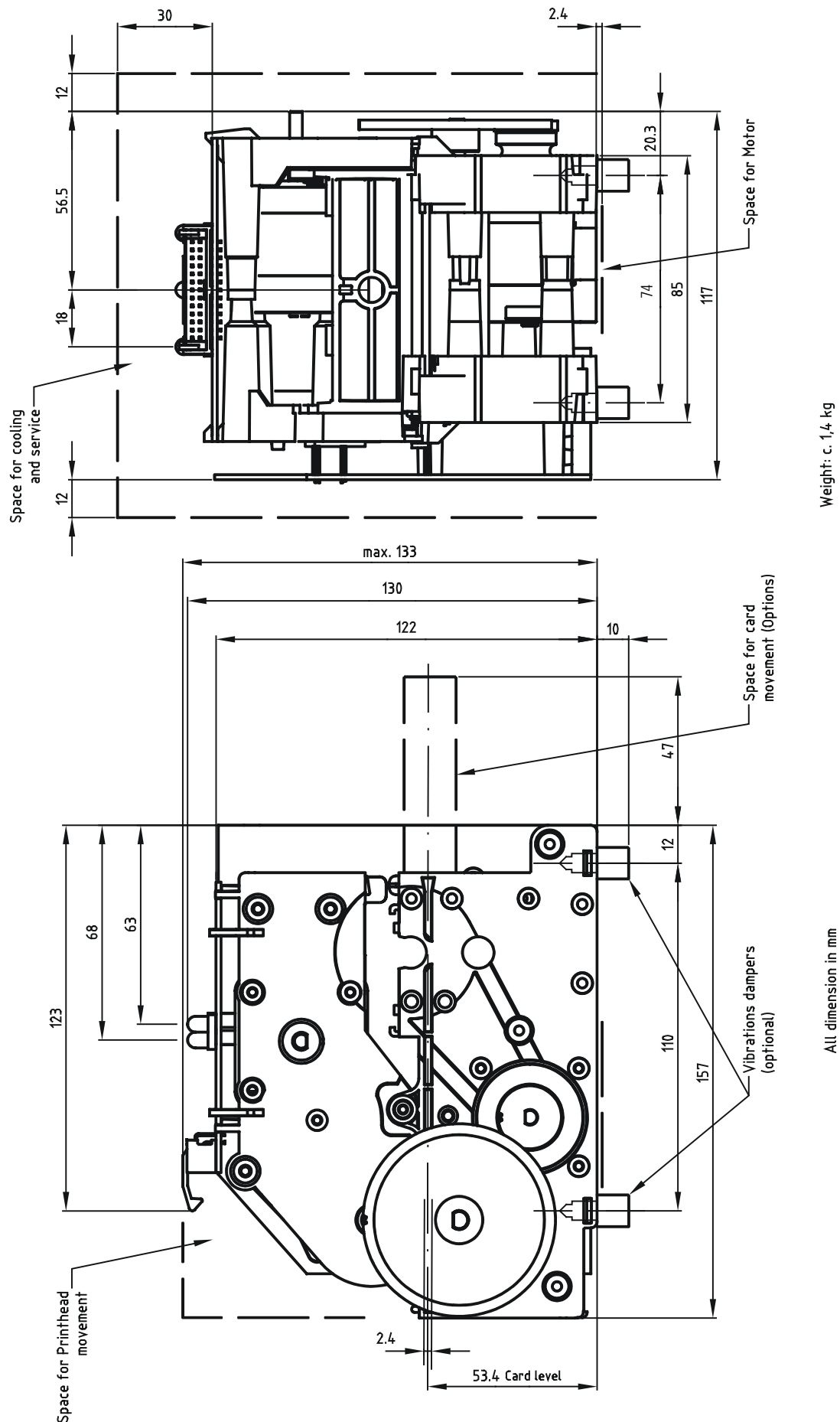
### 1.1. Operating Conditions

- Temperature: + 10°C to + 50°C
- Relative humidity: 20% to 80% (no condensation)
- Keep out of direct sunlight
- Keep away from chemicals, liquids, lubricants, dust etc.

### 1.2. Storage and Transport Conditions

- Storage temperature : 0°C to + 50°C
- Relative humidity : 10% to 90% (no condensation)

## 2. SCALE DIAGRAM OF THE PRINTER MECHANISM



### 3. POWER SUPPLY

#### CX-one: Power supply requirements:

Voltage: 24V DC +/- 1.2 V

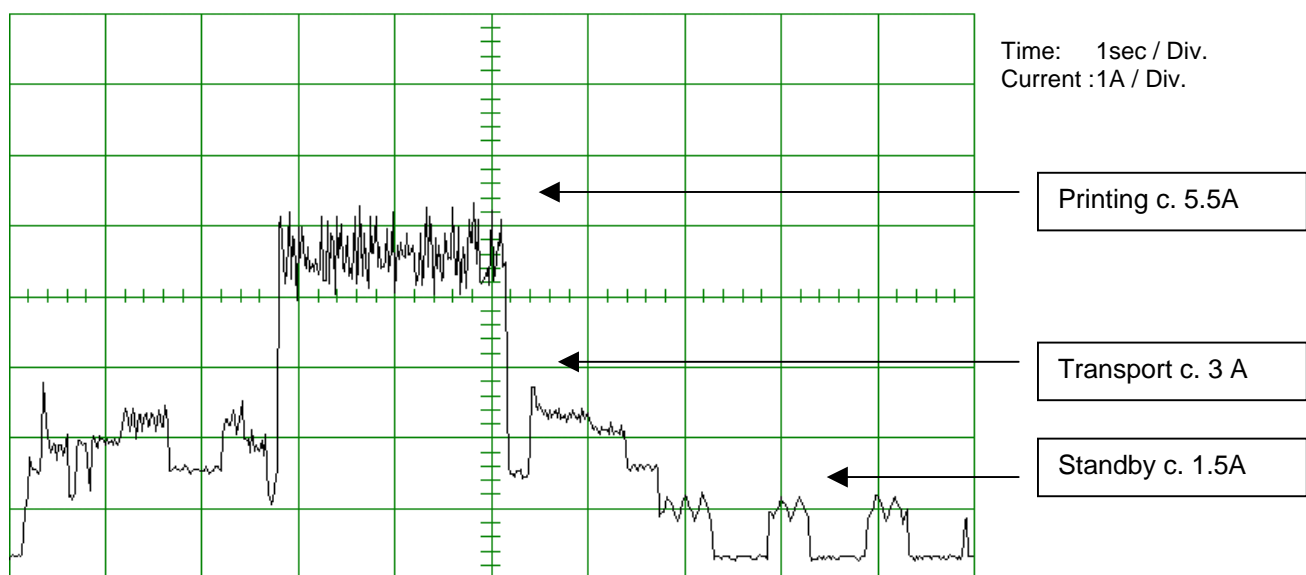
Max. ripple: max. 100 mV p-p

Noise (HF-ripple 20MHz) max. 300 mV p-p

current consumption: c. 5.5A printing  
c. 3A card transport  
c. 1.5A standby (heating active)

The following diagram shows the power profile of a typical card cycle. The level of power consumption during printing depends primarily on the print image (i.e. the number of dots being printed). As a result, practical power profiles may differ from the diagram. When choosing your power supply you should ensure sufficient power reserves at your power supply unit.

The connection of optional devices such as magnetic card or chipcard readers, card feeders, etc., is not taken into account in the diagram.



CX-one: current consumption [24V supply]

Printer mode: standby, transport, printing

#### Electrical Safety:

Use power supply units which satisfy at least the standards of Norm EN-60950 (SELV circuit). Please note that you may need to adhere to other safety standards, depending on the function of the entire device in which the Module operates.

WARNING: The OEM Module has no excess-current-cut-out.

## 4. TIPS ON INSTALLATION AND SAFETY

The CX-one OEM Module is designed for installation in a variety of other devices (e.g. vending machines, ticket dispensers). To ensure trouble-free implementation, we recommend the following practices.

**Adhering to safety standards, acquiring certification, and upholding industry standards are entirely the responsibility of the product integrator. They are not the responsibility of Clearjet GmbH.**

- Fire Protection:  
The various components of the CX-one printer mechanism are high-quality components and materials with flammability class V0.  
However, as the device contains numerous electronic components, as well as a heating element with a high operating temperature, the Module should be installed in a fire-resistant casing.  
Consult the relevant standards and regulations for the environment in which the finished device/machine will be implemented (e.g. EN-60950 for data processing devices in the office environment).
- Mounting:  
The Module is mounted using four screws (M4) at the base of the device (for mounting position, see Section 2 – Scale Diagram of the Printer Mechanism).  
If you are installing the Module without vibration dampers, ensure that you leave sufficient space below the motor (c. 2 mm). The motor has an elastic mounting and may vibrate lower than the base of the device.
- Operating Position:  
The optimal position for the Module is horizontal. Installing the device at a steep angle or vertically may lead to problems with functionality.
- Buffer space:  
The scale diagram (Section 2) gives various specifications for leaving buffer areas around the device. These are absolutely essential for the smooth running of the printer, and also ensure easy access to the device for maintenance, service and replacement of consumables.  
It is particularly important to keep sufficient distance between the conductive parts of the printer housing and the electronic components of the mechanism.  
Depending on the printer options implemented (e.g. magnetic encoding), it may also be necessary to leave room behind the device for card movement.
- Cables:  
Make sure to use cables with sufficient wire dimensions. In particular, too high voltage drop can lead to poor print quality.

- EMC:  
To satisfy electromagnetic disturbance standards (EN-55022) it may be necessary, depending on cable length, integration situation and housing construction, to use damping ferrites on the connection cables or adequate shielding methods.
- External light:  
For position measurement inside the device IR light sensors are used. These have integrated protection against external light interference, which should be sufficient for most applications in normal light conditions. However, to prevent malfunction, particularly in the presence of direct sunlight, you should take care that there is sufficient protection against external light.
- Acoustic insulation:  
Appropriate vibration dampers are available for noise-sensitive applications. Please note that fitting these dampers affects the height of the printer mechanism and also the card-movement level.
- Excess-current cut-out:  
The OEM Module has no integrated excess-current cut-out.  
Use appropriate excess-current-cut-out at power supply side.



## 5. CONNECTING ADDITIONAL DEVICES

### **Warranty exclusion:**

The following technical information is for qualified personell only. This should make integration and connection of the printer mechanism more easy.

This information implies no functional guarantee from CLEARjet GmbH.

CLEARjet GmbH is not responsible for function, quality, safety, CE-conformity and so on, if additional units are integrated to the printer, or the printer is connected to other units.

All integration steps and modifications, which are not made from CLEARjet GmbH are in the responsibility of the system integrator.

For connection of additional devices several connectors with controlling signals and power supply lines are available.

Specifically, this are control lines for chipcard and magnetic card interfaces, serial interfaces and for automatic card feeders, etc.

The functionality of these modules is varying and therefore the printer firmware must be adapted to the particular application. As a result controlling signals can be used only with suitably adapted firmware. For more information, contact your CLEARjet Partner.

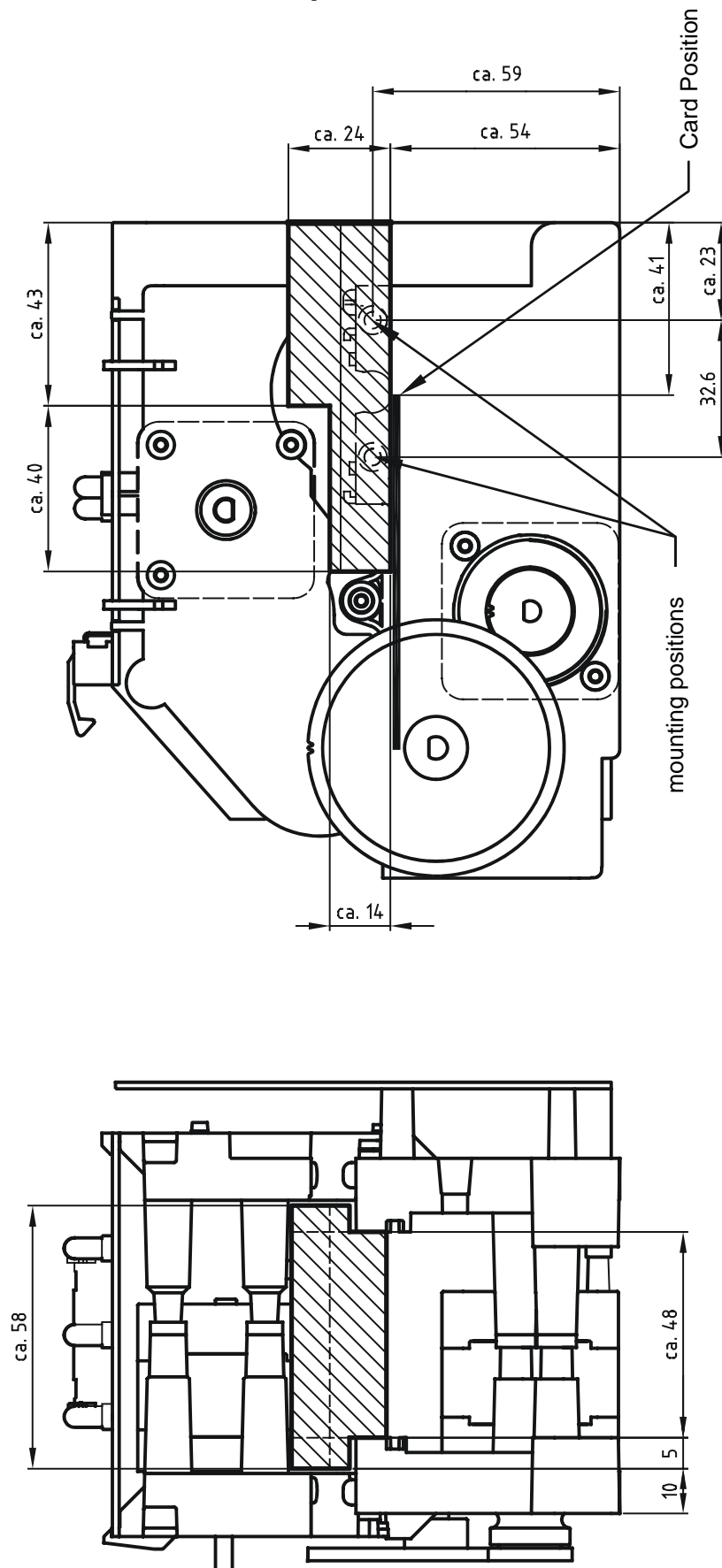
## 6. INTEGRATION OF CHIPREADERS

### **6.1. Preface**

It is frequently necessary to integrate Smart card interfaces to the printer. Therefore we collected some general information to this subject.

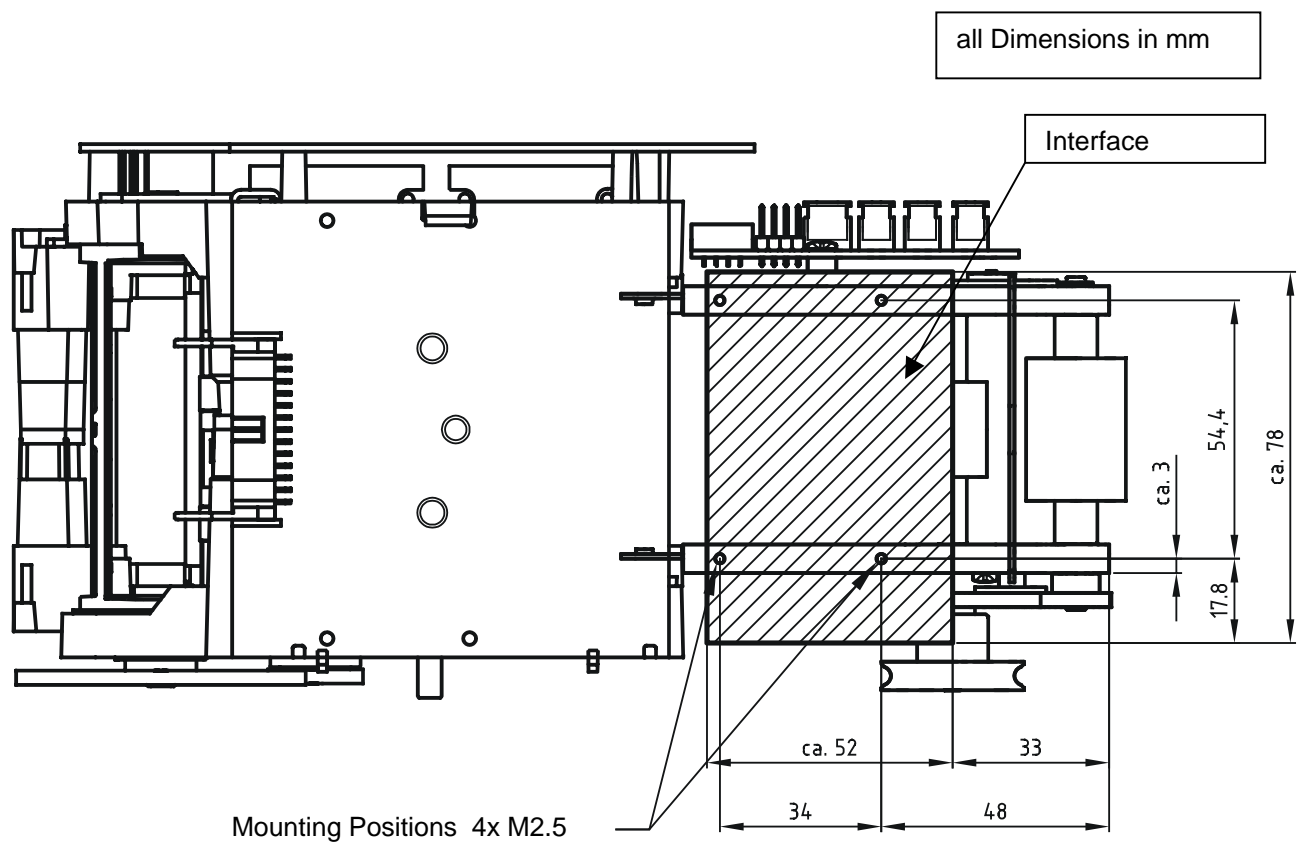
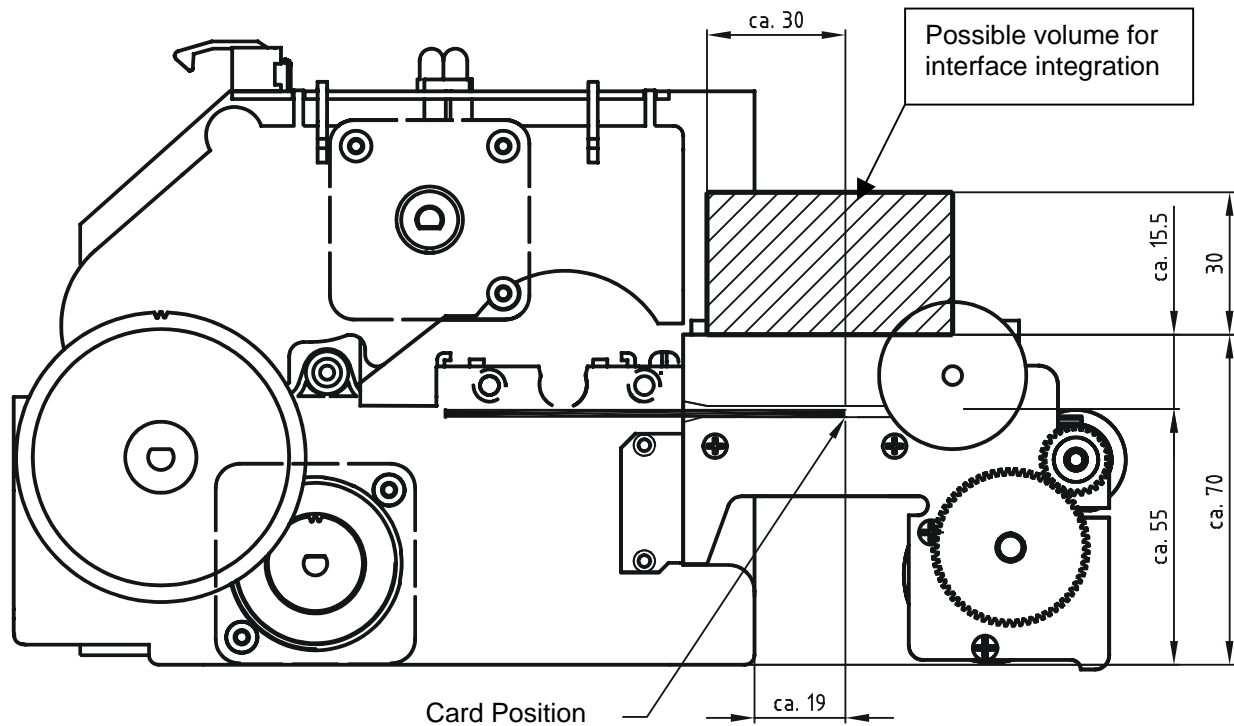
Chip readers with serial (TTL-level) interface and power supply connector can be connected to the printer. In this case the full functionality of the Chip interface inside the printer is obtained.

## 6.2. Integration to standard - printer



all Dimensions in mm

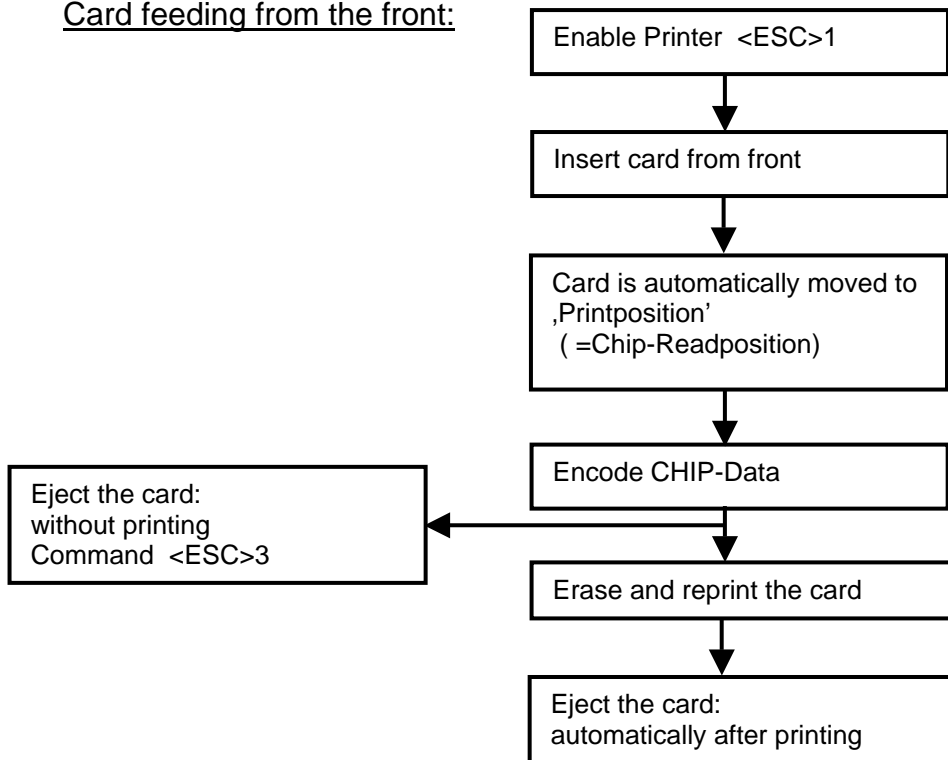
### 6.3. Integration to printer with hopper option



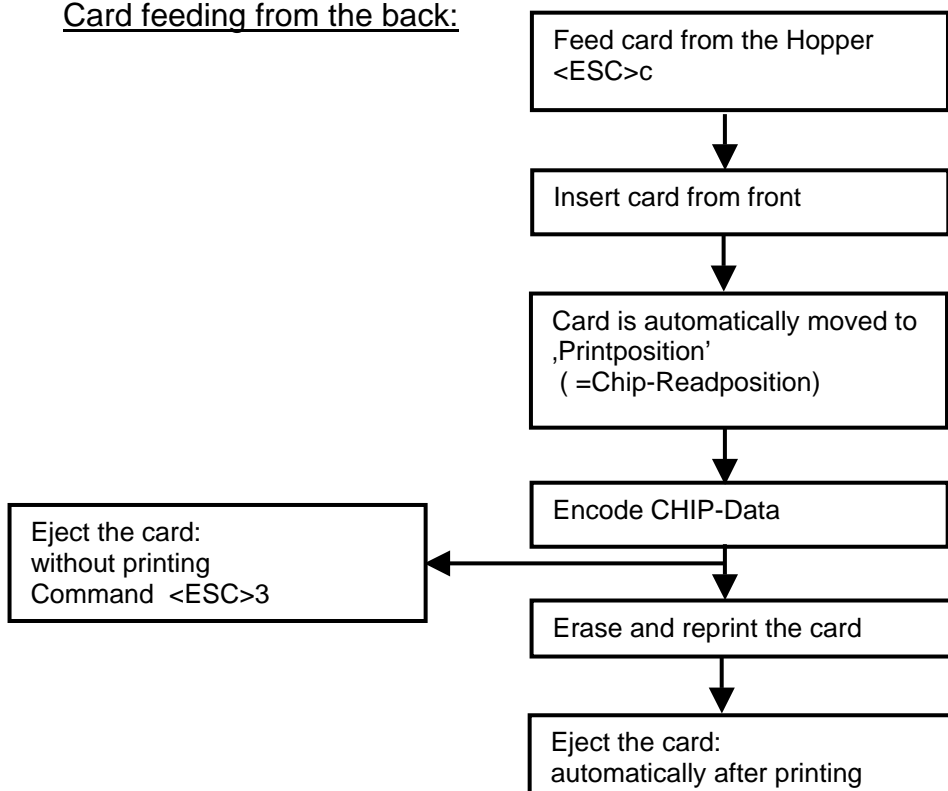
## 6.4. Function specification

### 6.4.1 Function mode - positioncontrolling

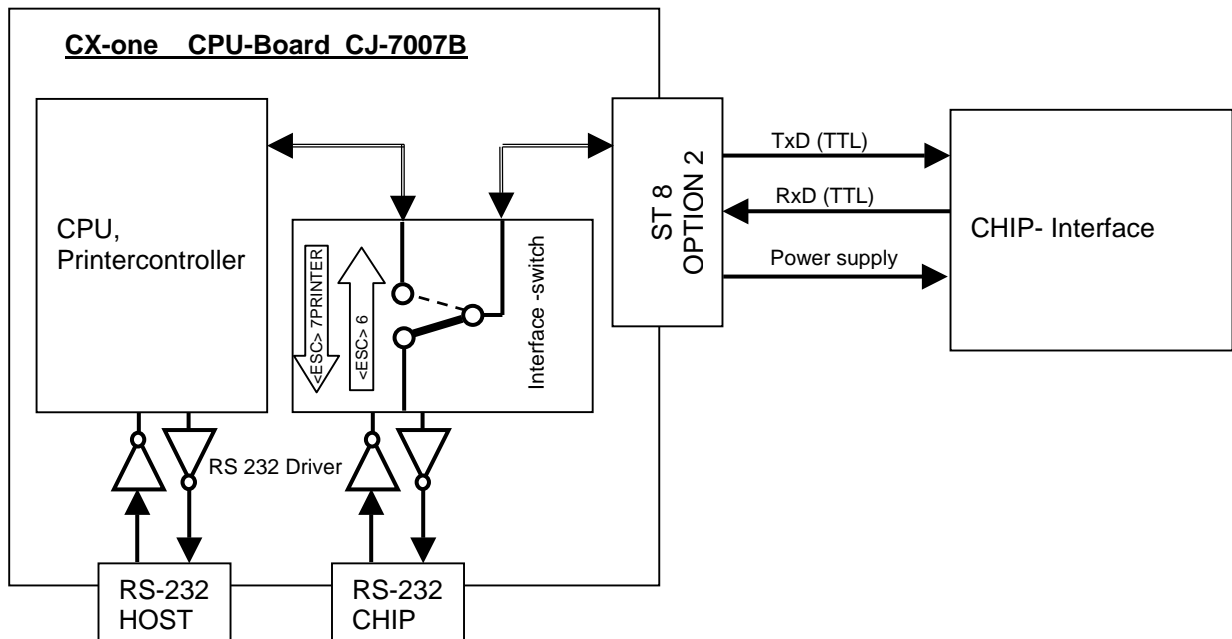
#### Card feeding from the front:



#### Card feeding from the back:



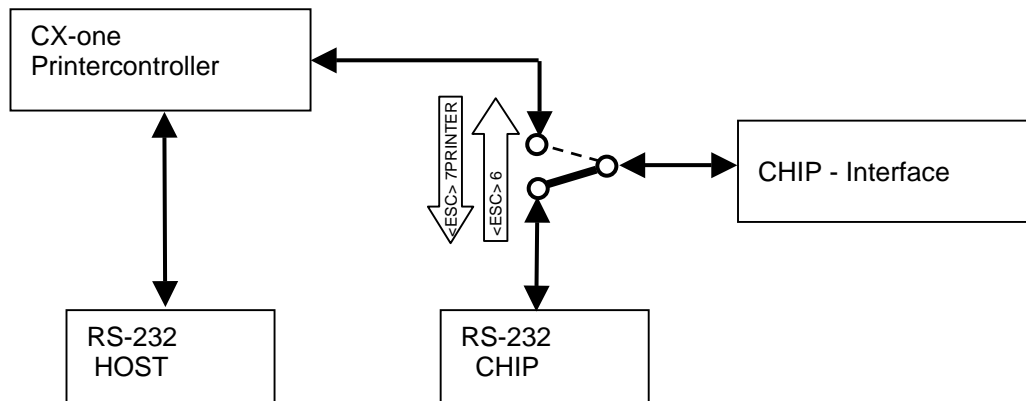
### 6.4.2 Connecting schematic – overview:



#### RS-232 Interface - switch

The CX-one Printer contains two separate RS-232 interfaces, one for controlling the printer mechanism and the other for controlling the chip-reader.

To control both units (printer and chipreader) with one interface we integrated a special 'interface – switch' to the CX-one. With the command <ESC>6 (transparent-mode) the RS232-HOST interface can be switched from the printer to the chip-reader unit.

Function of interface - switch:

- In normal operating mode the printer-unit is controlled via the interface RS232 HOST, and the chipreader via RS232 CHIP
- With the command <ESC>6 the 'transparent mode' is activated. The HOST interface path is switched from the printer to the chip-reader
- To switch back the interface path to the normal operating mode, use the command <ESC>7PRINTER

**6.4.3 Electrical connections**

The connector ST8 on the CPU-Board is reserved for connecting chipinterfaces.

To connect this interfaces several power-supply pins and the datalines #TXD1 und #RXD1 (see pin assignment ST8) are available.

Please pay attention to connect TTL-level signals only at the datalines. Connecting of RS-232 level signals (+/-12V) is not possible and will destroy the printer-electronic.

**Interface parameters:**

Baudrate:	9600 Bd
Dataformat:	8/N/1
Signal level:	TTL

Note:

If the 'transparent mode' is not used, all interface parameters can be configured freely (max. Baudrate 57600 Bd)

**Baudrate – conversion:**

The Baudrate of the 'HOST' interface can be selected up to 57600 Bd (see DIP-switch settings). Since the Baudrate of the 'CHIP' interface (transparent mode) is fixed to 9600 Bd the printer converts baudrates automatically.

Please note, that small delays may arise due to different transmission speed.

**Power supply for CHIP-interfaces**

To supply the chip-interfaces several outputs on connector ST8 are available (see pin assignment). As an option it is possible to install an additional DC/DC-Converter to the CX-one CPU-Board. This converters are available with different power and voltage levels.

VCC, GND :	internal power supply of printer electronics for external Modules: 5V +/-5%, max. 50mA
+24V, GND :	24V output (directly connected to the supply of the printer mechanism) for external Modules: max. 0.5A
Vout, 0V :	Output from optional DC/DC converter dependant on used converter: 3.3V, 5V, 12V or 15V galvanic separation is possible output power: 2 – 6 W, depending on converter type

Please note that you should take these additional output currents into account when selecting your power supply unit.

**6.4.4 Connecting the CHIP-contact unit :**

To integrate commercial Chipreaders, special printer version with integrated contact-units are available.

The printer moves the chipcard automatically to the reading position and contacts the chipcard. The chipcontact-lines can be used freely (cable with open end).

Position of the contact unit complies to ISO 7810.

**Kontakt unit – pin assignment:**

Pin No.:	Signal	Description
1	Switch1	Cardsensor
2	Switch2	Cardsensor
3	C8	N.U.
4	C4	N.U.
5	C7	I/O
6	C3	CLK
7	C6	VPP
8	C2	RST
9	C5	GND
10	C1	CHIP-VCC

**Note:**

The cardsensor (signal SWITCH1 und SWITCH2) is a potential free switching contact. The switch is closed, when the smartcard is contacted. (capacity: max. 12V / 100mA DC )

## 6.5. General hints

### Temperature:

Please note, that there can be higher temperature levels inside the device (depending on operating situations). Make shure, that the function of the integrated unit is compatible to this conditions.

### Disturbances:

The printer produces, dependent on operating situations, electrical and magnetic fields.

Specially in the near of the motors, this may cause function-problems of integrated units ( e.g.: RF-Chipreaders).

## 7. TIPS ON CONFORMITY

Please note that our conformity declaration (CE-certification) only applies to our fully assembled devices.

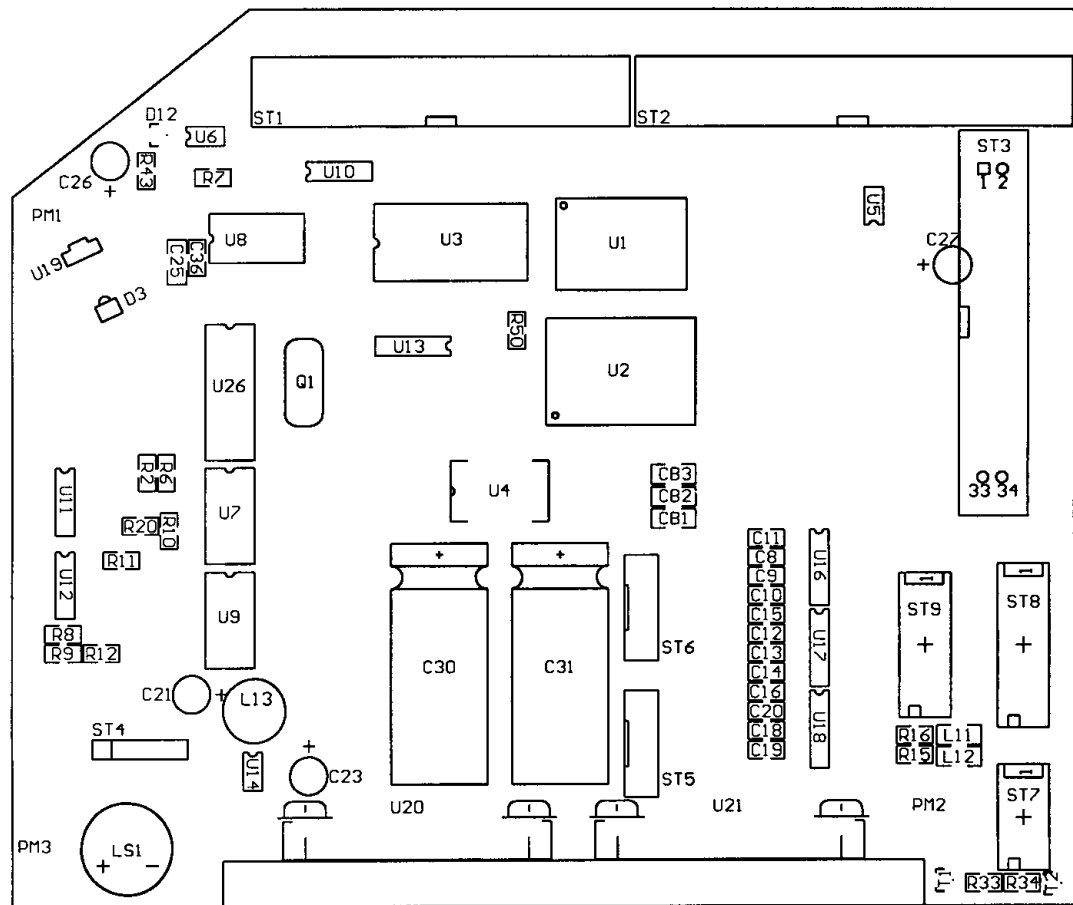
The OEM printer mechanism is a component designed for integration into other devices (e.g. vending machines, ticket dispensers, etc.). Therefore it is distributed without housing, power supply units and cables.

As housing, power supply units and cables are important for certification, we are unable to supply conformity declarations for OEM Modules.

Independently we confirm that the modules are designed to fulfill all relevant standards for certification if correctly installed and if adequate EMC techniques for integration are used.



## 8. CONNECTION DIAGRAM



Cj-7007b.pcb

Mechanical Layer 1

## 9. PIN ASSIGNMENT

<b>ST3 CPU-Board</b>	1	+24V	24V Power Supply	<b>Power Supply</b>
	2	+24V	24V Power Supply	
	3	+24V	24V Power Supply	
	4	+24V	24V Power Supply	
	5	+24V	24V Power Supply	
	6	+24V	24V Power Supply	
	7	GND	Power Supply GND	
	8	GND	Power Supply GND	
	9	GND	Power Supply GND	
	10	GND	Power Supply GND	
	11	GND	Power Supply GND	
	12	GND	Power Supply GND	
DB9 male - PIN1	13	n.c.		<b>HOST</b>
	PIN6	loop to Pin 19	Deactivate Handshake from PC	
	PIN2	15	RXD0 Receive Data Input	
	PIN7	16	RTS0 Request To Send Output	
	PIN3	17	TXD0 Transmit Data Output	
	PIN8	18	n.c.	
	PIN4	19	loop to Pin 14 Deactivate Handshake from PC	
	PIN9	20	n.c.	
DB9 male - PIN1	PIN5	21	GND Signal Ground	<b>RS-232</b>
	PIN1	22	DCD1 Data Carrier Detect Input	
	PIN6	23	DSR1 Data Set Ready Input	
	PIN2	24	RXD1 Receive Data Input	
	PIN7	25	RTS1 Request To Send Output	
	PIN3	26	TXD1 Transmit Data Output	
	PIN8	27	CTS1 Clear To Send Input	
	PIN4	28	DTR1 Data Terminal Ready Output	
	PIN9	29	RI1 Ring Indicator Input	<b>CHIP</b>
	PIN5	30	GND Signal Ground	
		31	D+ Data Line	
		32	D- Data Line	
		33	VBUS Power Supply from Bus	<b>USB</b>
		34	GND Signal Ground	

<b>ST7 CPU-Board</b>	1	FEED1	Open Drain Output max. 200mA	<b>HOPPER</b>
Option 1	2	FEED2	Open Drain Output max. 200mA	
	3	IN1	Input / TTL Level	
	4	IN2	Input / TTL Level	
	5	VCC	5V Power Supply Out	
	6	+24V	24V Power Supply Out	
	7	GND	Signal and VCC Ground	
	8	GND	Signal and VCC Ground	

<b>ST8 CPU-Board</b>	1	VCC	5V Power Supply Out	<b>Various options</b>
Option 2	2	VCC	5V Power Supply Out	
	3	#TXD1	Transmit Data Output / TTL Level	
	4	I/O1	I/O Signal for Options / TTL Level	
	5	#RXD1	Receive Data Input / TTL Level	
	6	#RTS1	Request To Send Output / TTL Level	
	7	GND	Signal and VCC Ground	
	8	GND	Signal and VCC Ground	
	9	I/O2	I/O Signal for Options / TTL Level	
	10	I/O3	I/O Signal for Options / TTL Level	
	11	I/O4	I/O Signal for Options / TTL Level	
	12	0V	GND from DC/DC Converter	
	13	VOUT+	Power Supply from DC/DC Converter	
	14	+24V	24V Power Supply Out	

<b>ST9 CPU-Board</b>	1	DCD1	Data Carrier Detect Input	<b>Modem Connection</b> Parallel to CPU Board ST3 Pin22 - 30
Option 3 (RS232-1)	2	DSR1	Data Set Ready Input	
	3	RXD1	Receive Data Input	
	4	RTS1	Request To Send Output	
	5	TXD1	Transmit Data Output	
	6	CTS1	Clear To Send Input	
	7	DTR1	Data Terminal Ready Output	
	8	RI1	Ring Indicator Input	
	9	GND	Signal Ground	
	10	VCC	5V Power Supply for Options Out	
	11	VOUT+	Power Supply from DC/DC Converter	
	12	0V	GND from DC/DC Converter	

<b>ST3 PH-Controller Board</b>	1	LED 1 red	Cathode	<b>LED</b>
external LED	2	LED 2 yellow	Cathode	
	3	LED 3 green	Cathode	
	4	VCC	Common Anode	

NOTE: This connector is located on the PH-controller board (on the left / rear board edge)

Standard LEDs may be directly connected.

Diode current:  $I_F = c. 8 \text{ mA}$  (at  $V_F = 1.2 - 1.4 \text{ V}$ )

Current limiting resistors (470 Ohm – 5 V) are located on the PH-controller board.